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10/577,295	04/26/2006	Leendert De Bruin	NL03 1257 US	4965

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PO BOX 3001
BRIARCLIFF MANOR, NY 10510-8001

EXAMINER	
BEMBEN, RICHARD M	

ART UNIT	PAPER NUMBER
2622	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,295	DE BRUIN ET AL.	
	Examiner	Art Unit	
	RICHARD M. BEMBEN	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2006*.

2a)☐ This action is FINAL. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 April 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the at least two or more transparent plates required by claim 3 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 12 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The limitation: "the grooves between the individual image sensors formed by this operation and the grooves that are defined" is unclear in the context of the surrounding limitations. The Examiner is unsure what/how the aforementioned limitation is modifying. Please clarify the claim language or explain its meaning.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 2, 4 and 6-8 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 7,453,509 issued to Losehand et al., hereinafter "Losehand".

Regarding claim 1, Losehand discloses a camera module comprising (refer to c. 8, l. 55 – c. 9, l. 26 and Figure 3)

a housing (c. 7, l. 62 and Figure 3, "plastic body 5") containing a solid-state image sensor with a radiation-sensitive surface (c. 8, l. 65 and Figure 3, "semiconductor sensor 9"), and an optical element located above the solid-state image sensor and the housing forming a shield against laterally scattered radiation to protect the radiation-sensitive surface (c. 8, l. 59 – c. 9, l. 13 and Figure 3, “transparent block 44”); and

the housing includes a disk-shaped body with a primary radiation-opaque area (c. 9, ll. 22-26 and Figure 3, opening at top for "protuberance 31") and a secondary radiation-transparent area (c. 8, ll. 66-67 and Figure 3, “aperture 14”) located within the primary area, the secondary area is located above the radiation-sensitive surface of the sensor and wherein a surface close to the sensor is smaller than a surface remote from the sensor (refer to Figure 3, “aperture 14” is smaller than the opening at top for "protuberance 31"); and

the optical element includes at least one plate of transparent material having two sides, each side covered with a layer of radiation-opaque material (ROM), and an aperture is defined in the at least one plate (c. 8, l. 55 – c. 9, l. 26 and Figure 3); and

wherein the aperture in the ROM layer deposited on a side of the at least one plate close to the sensor has a smaller surface area than the aperture in the ROM layer on a side of the at least one plate remote from the sensor (refer to Figure 3, “aperture 14” is smaller than the opening at top for "protuberance 31") and

wherein the primary radiation-opaque and secondary radiation-transparent areas are defined by portions of the plate of transparent material sandwiched between the radiation opaque layers and the apertures therein, respectively (refer to Figure 3).

Regarding claim 2, refer to the rejection of claim 1 and Losehand further discloses that the optical element includes a single transparent plate whose upper and lower surfaces are both covered with a radiation-opaque layer in which circular and concentric apertures are provided (refer to c. 8, l. 55 – c. 9, l. 26 and Figure 3).

Regarding claim 4, refer to the rejection of claim 1 and Losehand further discloses that the transparent material includes a glass or a synthetic material (refer to c. 8, l. 61: "homogeneous block made from transparent plastic").

Regarding claim 6, refer to the rejection of claim 1 and Losehand further discloses that the housing further comprises an optical component in the form of a lens which is also located above the radiation-sensitive surface of the sensor and which is formed in a further transparent plate (c. 9, l. 16 and Figure 3, "transparent plastic molding compound 47").

Regarding claim 7, Losehand discloses a mobile telephone (c. 4, ll. 32-36) or personal digital assistant provided with a camera module as claimed in claim 1 (refer to the rejection of claim 1).

Regarding claim 8, Losehand discloses a method of manufacturing a camera module (c. 10, l. 40 – c. 12, l. 47 and Figures 6-14), the camera module comprising (refer to c. 8, l. 55 – c. 9, l. 26 and Figure 3)

a housing (c. 7, l. 62 and Figure 3, "plastic body 5") containing a solid-state image sensor with a radiation-sensitive surface (c. 8, l. 65 and Figure 3, "semiconductor sensor 9"), and an optical element located above the solid-state image sensor and the housing forming a shield against laterally scattered radiation to protect the radiation-sensitive surface (c. 8, l. 59 – c. 9, l. 13 and Figure 3, “transparent block 44”); and

the housing includes a disk-shaped body with a primary radiation-opaque area (c. 9, ll. 22-26 and Figure 3, opening at top for "protuberance 31") and a secondary radiation-transparent area (c. 8, ll. 66-67 and Figure 3, “aperture 14”) located within the primary area, the secondary area is located above the radiation-sensitive surface of the sensor and wherein a surface close to the sensor is smaller than a surface remote from the sensor (refer to Figure 3, “aperture 14” is smaller than the opening at top for "protuberance 31"); and

the optical element includes at least one plate of transparent material having two sides, each side covered with a layer of radiation-opaque material (ROM), and an aperture is defined in the at least one plate (c. 8, l. 55 – c. 9, l. 26 and Figure 3); and

wherein the aperture in the ROM layer deposited on a side of the at least one plate close to the sensor has a smaller surface area than the aperture in the ROM layer on a side of the at least one plate remote from the sensor (refer to Figure 3, “aperture 14” is smaller than the opening at top for "protuberance 31") and

wherein the primary radiation-opaque and secondary radiation-transparent areas are defined by portions of the plate of transparent material sandwiched between the radiation opaque layers and the apertures therein, respectively (refer to Figure 3).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Losehand in view of US Patent No. 5,673,083 filed by Izumi et al., hereinafter "Izumi".

Regarding claim 3, Losehand discloses the limitations required by claim 1, including an optical element wherein at least one side is covered with a radiation-opaque layer in which an aperture has been defined and whereby the circumferences of the apertures are substantially located on a cone. However, Losehand does not disclose that the optical element includes two or more transparent plates which are separated from each other and of which at least one side is covered with a radiation-opaque layer in which an aperture has been defined and whereby the circumferences of the apertures are substantially located on a cone.

Izumi discloses a camera module comprising an optical element that includes two or more transparent plates which are separated from each other and of which at least one side is covered with a radiation-opaque layer in which an aperture has been defined and whereby the circumferences of the apertures are substantially located on a cone (refer to Figure 1A, plural lenses form an optical element between aperture 190

and the lower opening defined by the housing, wherein the housing is opaque). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have two or more transparent plates in the form of lenses as disclosed by Izumi in the camera module disclosed by Losehand in order to effectuate precise image focus on the image sensor.

8. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Losehand in view of US Patent No. 6,795,120 issued to Takagi et al., hereinafter "Takagi".

Regarding claim 5, Losehand discloses the limitations required by claim 1, including opaque layers. However, Losehand does not disclose that the opaque layers are made of blackened metal.

Takagi discloses a camera module (refer to c. 12, l. 55 - c. 14, l. 31 and Figures 21-24) comprising an opaque layer made of blackened metal (c. 13, ll. 6-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention for an opaque layer to be made of blackened metal as disclosed by Takagi in the camera module disclosed by Takagi because metal film evaporation is a widely used and notoriously well-known process in the art of semiconductor manufacturing and metal films are widely used and notoriously well-known light-shield in the art of image sensors.

<Alternative Rejection> Regarding claim 6, Losehand discloses the limitations required by claim 1, including an optical element located above the solid-state image

sensor and a second transparent element between the optical element and the solid-state image sensor (c. 9, l. 16 and Figure 3, "transparent plastic molding compound 47"). However, Losehand does not expressly disclose that the housing further comprises an optical component *in the form of a lens* which is also located above the radiation-sensitive surface of the sensor and which is formed in a further transparent plate.

Takagi discloses a camera module (refer to c. 7, l. 36 – c. 8, l. 14 and Figure 6) comprising an optical element (Figure 6, “filter 15”) located above a solid-state image sensor (Figure 6, “solid-state imaging device 3”) and further comprising an optical component *in the form of a lens* which is also located above the radiation-sensitive surface of the sensor and which is formed in a further transparent plate (Figure 6, “lens 13”). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have a lens disposed between an optical element and a solid-state image sensor as disclosed by Takagi in the camera module disclosed by Losehand in order to effectuate precise image focus on the image sensor.

9. Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Losehand in view of US Pub. No. 2006/0027740 filed by Glenn et al., hereinafter “Glenn”.

Regarding claim 9, Losehand discloses the limitations required by claim 8, including the various components of the camera module and a method of manufacturing the camera module. However, Losehand does not disclose manufacturing the camera

module in "stacks", characterized in that there is a plurality of optical elements and, if required a plurality of further components such as a lens are formed in a first stack of disk-shaped bodies, and a plurality of solid-state image sensors are formed in a second stack of disk-shaped bodies, in which the electrical connections of the solid-state image sensors extend to the lower side of the second stack and part of the first stack is deposited on each image sensor, after which individual camera modules are obtained by separating the second stack of image sensors by means of a dicing operation.

Glenn discloses a method of manufacturing a camera module characterized in that there is a plurality of optical elements and, if required. a plurality of further components such as a lens are formed in a first stack of disk-shaped bodies, and a plurality of solid-state image sensors are formed in a second stack of disk-shaped bodies, in which the electrical connections of the solid-state image sensors extend to the lower side of the second stack and part of the first stack is deposited on each image sensor, after which individual camera modules are obtained by separating the second stack of image sensors by means of a dicing operation (refer to [0140]-[0145] and Figure 8). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to manufacture the camera module disclosed by Losehand using the stack method disclosed by Glenn because bonding/adhering wafers/components/stacks is a common and well-known practice in semiconductor fabrication.

Regarding claim 10, refer to the rejection of claim 9 and Glenn further discloses using a using a pick-and-place machine (the MRSI 505) to align components after a

dicing operation ([0138]). Further, both dicing and alignment via a pick-and-place machine are industry standard techniques in semiconductor fabrication. Therefore, it would have been obvious to deposit on a first stack ("lens stack") on a second stack ("image sensor stack") after dicing operations using a pick-n-place machine.

Regarding claim 11, refer to the rejection of claim 9 and Glenn further discloses that the first stack is aligned with and mounted on the second stack and the optical elements, any additional optical components and the image sensors, are separated via a single dicing operation (refer to [0142]-[0145]).

Allowable Subject Matter

10. Claim 12 may be objected to as being dependent upon a rejected base claim and might be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, until the 35 USC 112 rejection (addressed above) is resolved, it is not possible to determine the scope of the claim or make a patentability determination.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RICHARD M. BEMBEN whose telephone number is (571)272-7634. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David L. Ometz/
Supervisory Patent Examiner, Art Unit 2622

RMB